Gravatt, Dan

From: Monnig, Rob <rob.monnig@tetratech.com>
Sent: Monday, May 19, 2014 2:17 PM
To: Dempsey, Gregg D.; Telofski, Scott; pac4@cdc.gov
Cc: Johnson, James; Hooper, Charles A.; Gravatt, Dan; Beringer, Mike; Rosnick, Reid
Subject: West Lake Off-Site Air Monitoring Investigaiton Levels for Rad Parameters (DRAFT FOR DISCUSSION)
Attachments: WLLS - Summary of Radiological Sampling and Investigation Levels_DRAFT FOR DISCUSSION_RM_2014_05_19.xlsx

Hi All,

Chuck and I would appreciate any comments to the attached draft sampling approach and investigation levels for rad parameters for the off-site air monitoring around West Lake Landfill. Two sets of investigation levels have been proposed—the first is a "yellow level" which would not generally indicate an immediate health concern, but would warrant follow up; and the second set being the "red level" which would warrant an immediate review/response by EPA and other supporting agencies.

Thanks in advance for your suggestions. If you're able to respond before the long weekend—that would be much appreciated.

Thanks,
Rob

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DRAFT TABLE
SAMPLING PLAN AND INVESTIGATION LEVELS FOR RADIOLOGICAL PARAMETERS
AMBIENT AIR MONITORING FOR WEST LAKE LANDFILL SITE

SAMPLING PLAN						DETECTION CAPABILITY		INVESTIGATION LEVELS			
								Investigations Level Protective of Sub-Chronic Durations (Weeks to Years)		Investigation Levels Warranting an Immediate Response	
Sample or Measurement Type	**Data Use**	**Sampling Frequency/ Deployment Method**	**Integration Time**	**Parameter(s)**	**Reported Units**	**Minimum Detectable Activity (MDA)**	**Expected Background Activity**	**Level**	**Basis**	**Level**	**Basis**
Gamma by Saphymo GammaTRACER	Provide the primary means of assessing external gamma exposure rates[1]	Continuous measurements (approximately 1 measurement every second) are reported by the instrument; before comparison to investigation levels, these measurements will be numerically integrated into 1 hour time-weighted averages.	1 hour	Gamma	µR/hr	0.1 µR/hr	5 - 10 µR/hr	**100 µR/hr** (1-hour average) **30 µR/hr** (24-hour average)	These exposure rates exceed typical background rates (i.e., would be readily detectable above background), but would not indicate an immediate health risk of concern[1].	**2 mrem/hr** (1-hour average)	10 CFR 20.1301(a)(2) Dose Limits for Individual Members of the Public
Gamma by AreaRAE	Provide an observational and supplemental indication of external gamma exposure rates[2]	Continuous measurements will be numerically integrated into 1 hour time-weighted averages.	1 hour	Gamma	µR/hr	1 µR/hr	5 - 10 µR/hr	**100 µR/hr** (1-hour average) **30 µR/hr** (24-hour average)	These exposure rates exceed typical background rates (i.e., would be readily detectable above background), but would not indicate an immediate health risk of concern[1,2].	**2 mrem/hr** (1-hour average)	10 CFR 20.1301(a)(2) Dose Limits for Individual Members of the Public
Gamma by thermoluminescence dosimeter (TLD)	Provides a redundant external gamma exposure rate measurement in case of failure of the Saphymo GammaTRACER[3]	TLDs are passive sampling devices that yield a measurement with an integration time equal to their sampling time; TLDs will be deployed continuously for sampling periods of approximately 30 days each.	30 days	Gamma	mrem	1 mrem *see note*[3]	5 - 10 mrem/month	*None specified*	Real-time gamma exposure rates from the Saphymo GammaTRACER would trigger an investigation	*None specified*	Real-time gamma detectors would trigger an investigation
Radon by electret ion chamber	Compare any measurable (detectable above background) release of radon attributable to RIM to health-based criteria	Electret ion chambers are passive sampling devices that yield a measurement with an integration time equal to their sampling time; the individual chambers will be deployed continuously for sampling periods of 7 days each.	7 days	Radon	pCi/L	~0.5 pCi/L	0.1 - 1 pCi/L	**4 pCi/L** (7-day average)	EPA-recommended residential mitigation level	**30 pCi/L** *abbreviated sampling duration required*[4]	10 CFR 20, Table 1, Col. 3 DAC applicable to the control of dose in occupational settings
Radionuclides in airborne particulates by weekly filter	Compare any measurable airborne release of RIM (detectable above background conditions) to health-based criteria	Airborne particulates will be collected onto filters that will be collected and replaced with a new filter weekly. Filters are submitted for laboratory analysis of radionuclides.	7 days	Thorium-230	pCi/m^3	2E-3 pCi/m^3 *see note*[5]	unknown	**2E-2 pCi/m^3** above background (7-day average)	10 CFR 20, Table 2, Col. 1 (air concentration value applicable to the control of dose to the public)	**100 pCi/m^3** *abbreviated sampling duration required*[4]	10-percent of the site-specific value of 1,000 pCi/m^3 derived by EPA per the EPA Protective Action Guides and Planning Guidance for Radiological Incidents (PAG Manual).[6]
				Radium-226	pCi/m^3	2E-3 pCi/m^3 *see note*[5]	unknown	**9E-1 pCi/m^3** above background (7-day average)	10 CFR 20, Table 2, Col. 1 (air concentration value applicable to the control of dose to the public)	**65 pCi/m^3** *abbreviated sampling duration required*[4]	10-percent of the site-specific value of 650 pCi/m^3 derived by EPA per the EPA Protective Action Guides and Planning Guidance for Radiological Incidents (PAG Manual).[6]
				Other reported parameters: gross alpha/beta, gamma spectroscopy (reporting various radionuclides), and isotopic uranium	pCi/m^3	various	various	*None specified*	These parameter are not of primary concern based on the characteristics of the West Lake Landfill RIM; however, these parameters will be evaluated if investigation levels for Thorium-230 or Radium-226 are reached.	*None specified*	These parameter are not of primary concern based on the characteristics of the West Lake Landfill RIM; however, these parameters will be evaluated if investigation levels for Thorium-230 or Radium-226 are reached.

Notes

[1] Note that a release of RIM via airborne particulates at investigation levels for the primary radionuclides of concern (Thorium-230 and Radium-226) is not anticipated to yield an external gamma exposure rate that would be distinguishable from background. This determination is based on calculations by EPA using MicroShield to model an airborne plume containing RIM. Sources of gamma activity not related to West Lake Landfill RIM may occasionally yield a detector response above background. Such sources may include patients receiving nuclear medicine or medical transport shipments.

[2] The presence of a gamma sensor in this multi-sensor instrument is incidental to other data collection needs and the usability of the data from this sensor for non-emergency response purposes is uncertain based on reports from others of temperature sensitivity. Therefore, this data will only be used observationally and in conduction with data from other instruments.

[3] For exposure rates typical of background levels, the reported dose yielded by the thermoluminescence dosimeter (TLD) badges is expected to be significantly influenced by contributions of dose received during transit of the badges to and from the service provider.

[4] Abbreviated sampling durations would be required to ascertain these investigation levels within a time period of hours or days.

[5] Anticipated minimum detectable activity corresponds to a sampling rate of 2 cubic feet per minute, a sampling duration of 7 days, and per-filter laboratory detection limit of 1 pCi.

[6] This value was derived per EPA Protective Action Guides and Planning Guidance for Radiological Incidents (PAG Manual) and corresponds to a total effective dose of 1 rem for a one day release.

CFR	Code of Federal Regulations	mrem/hr	microRoentgen equivalent-man per hour	pCi/L	picoCurie per liter
DAC	Derived Air Concentration	µR/hr	microRoentgen per hour	RIM	Radiologically-impacted material from West Lake Landfill
mrem	microRoentgen equivalent-man	pCi/m^3	picoCurie per cubic meter	rem	Roentgen equivalent-man